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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,504	04/19/2004	Herng-Jer Lee	CFP00361 (20040145.OR)	3469
23595 7590 07/09/2007 NIKOLAI & MERSEREAU, P.A. 900 SECOND AVENUE SOUTH SUITE 820 MINNEAPOLIS, MN 55402			EXAMINER YAARY, MICHAEL D	
			ART UNIT 2193	PAPER NUMBER
			MAIL DATE 07/09/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/827,504	<b>Applicant(s)</b> LEE ET AL.	
	<b>Examiner</b> Michael Yaary	<b>Art Unit</b> 2193	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 April 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04/19/2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

1. Claims 1-3 are pending in the application.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Herng-Jer Lee, Chia-CHI Chu, and Wu-Shiung Feng; Intelligent multipoint Arnoldi (IMA) approximations of FIR order linear-phase IIR filters; 26-29 May 2002; Dept. of Electr. Eng., Chang Gung Univ., Taoyuan, Taiwan; Circuits and Systems, 2002. ISCAS 2002. IEEE International Symposium on; Volume 1; Page I-417 - page I-420 (hereafter Lee).
4. **As to claim 1**, Lee discloses a method of approximating an FIR filter with low-order linear-phase IIR filters by the rational Arnoldi algorithm with adaptive orders (Page I-417, abstract, lines 1-12) containing the following steps:
  - a. Initialize the first vector of the Krylov sequence for each expansion point (page I-418, column 2, step 0, lines 1-5);

b. In the  $j$ th iteration of the algorithm, choosing an expression frequency such that the frequency gives the greatest difference between the  $(j+1)$ st-order output moment of the original FIR filter  $H(z)$  and that of the lower-ordered IIR filter  $H(z)$  (Page I-418 – page I-419, step 1, lines 1-6);

c. After the choosing the expansion point in the  $j$ th iteration being determined, the single-point Arnoldi method applied at the expansion point to generate the new orthonormal vector (page I-419, step 2, lines 1-7); and

d. Determine a new residual at each expansion point for next iteration; whereby after the given total iteration number of the algorithm, outputting the resulting orthogonal projection matrix (Page I-419, step 3, lines 1-6).

5. **As to claim 3**, Lee discloses a) low-pass filters: the proposed method with the expansion point  $\omega_1 = 0$  (page I-419 column 1, Low-order filter design issues, lines 1-18);

(b) high-pass filters: the special structures of state-space matrices used to present the duality between low-pass and high-pass filters; let state matrices become  $\overline{A} = -A$ ,  $\overline{b} = b$ ,  $\overline{c} = c$ , and  $\overline{h_0} = -h_0$ , the expansion point  $\omega_1 = 0$  chosen to perform the Arnoldi algorithm; when the corresponding orthonormal matrix  $\overline{V}$  is obtained and then the high-pass IIR filter, which satisfies the same specifications as the original FIR filter (page I-419 column 1, Low-order filter design issues, lines 1-18); and

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(c) band-pass/band-stop filters: the passband edge and the stopband edge frequencies being the appropriate candidate expansion points in meeting the specifications of the design, and other expansion points with uniform spacing being recommend to be selected (page I-419 column 1, Low-order filter design issues, lines 1-18).

### ***Allowable Subject Matter***

6. Claim 2 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 102(b) set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Yaary whose telephone number is (571) 270-1249. The examiner can normally be reached on Monday-Friday, 8:00 a.m - 5:00 p.m..


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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